

# Malnutrition

Malnutrition is a pathological state caused by nutrient deficiency or excess. Advanced stages are referred to as **cachexia**. The highest degree of cachexia is **marasmus**. Malnutrition can also be an isolated deficiency of one of the necessary nutritional factors (vitamins, trace elements, essential fatty acids). The causes of malnutrition include conditions associated with decreased intake, increased nutrient losses, or increased metabolic requirements.

## Malnutrition classification

Malnutrition is defined as a **nutritional disorder** due to absolute or relative **nutrient deficiencies, excesses, or imbalances**. Malnutrition can be classified in several ways:

- **Malnutrition resulting from undernourishment:** nutrient deficiencies
- **Malnutrition resulting from overnutrition:** nutrient excesses\***General malnutrition:** arises from a lack or excess of energy in the diet (protein energy malnutrition, obesity).
- **Specific malnutrition:** arises from a deficiency or excess of individual nutrients.
- **Primary (exogenous) malnutrition:** insufficient or excessive nutrient intake. Primary malnutrition affects millions of people worldwide.
- **Secondary (endogenous) malnutrition** results from nutrient absorption disorders, nutrient utilization disorders ([https://www.wikilectures.eu/w/Malabsorption\\_syndrome](https://www.wikilectures.eu/w/Malabsorption_syndrome)) (enzyme (<https://www.wikilectures.eu/w/Enzyme>) defects), and the use of certain drugs that can alter nutrient metabolism. Secondary malnutrition is infrequent compared to some primary malnutrition. Environmental factors (xenobiotics, smoking (<https://www.wikilectures.eu/w/Smoking>)) may also contribute to malnutrition.
- **acute**
- **subacute**
- **chronic**

## Types of diseases

### Marasmus

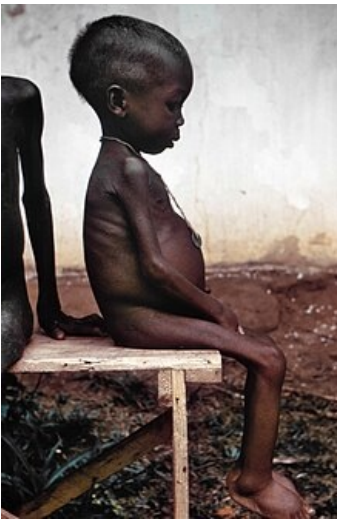
Marasmus (simple starvation) is caused by an insufficient supply of energy and protein. It is accompanied by proportional reduction of fat and fat-free mass, and edema does not develop. Cachectic appearance is apparent at normal albumin concentration and preserved immunoreactivity is clinically evident. Nutritional support is able to restore anabolism. This occurs in anorexia nervosa.



Marasmus

### Kwashiorkor

Kwashiorkor is a stress-induced, cytokine-induced (TNF- $\alpha$ , IL-1, IL-6) malnutrition. The body is not able to use carbohydrates and lipids as an energy substrate. In combination with reduced protein intake, they must use visceral, plasma, and muscle proteins. The fat stores do not decrease and edema is present. Clinically, there is poor wound healing, pressure ulcers, and there is a risk for more frequent infections. This occurs in MODS and sepsis. Nutritional support is only able to slow down this type of malnutrition.



Kwashiorkor

## Protein-energy malnutrition

It is a combination of marasmus and kwashiorkor.

## Clinical manifestation of malnutrition

### General symptoms

- Loss of subcutaneous fat will cause loss of round contours.
- The skin rests loosely over the deeper tissue: best visible over the triceps and interosseous muscles.
- Loss of muscle above the quadriceps and deltoid.
- Bony appearance of the shoulders.
- Hypoproteinemia, edema in the sacral region and/or perimalleolar region, or ascites.
- Changes in mental state
- Changes in mucous membranes, skin and adnexa (alopecia, brittle nails).

### Symptoms of marasmus

- Starved appearance, weight loss. Fat stores and muscle mass are reduced.
- Normal visceral proteins.

### Symptoms of kwashiorkor

- Normal appearance and weight, preserved fat stores.
- Swelling, pressure ulcers, reduced wound healing, more common infectious complications.
- Decreased visceral proteins and lymphocytes, increased CRP.

## Assessment of nutritional status

### Anamnesis

- weight changes over the last 1-6 months;
- changes in food intake;
- presence of gastrointestinal manifestations (anorexia nervosa, nausea and vomiting, diarrhea);
- physical ability.

**Physical examination** including anthropometric measurements:

- subcutaneous fat condition, muscle, swelling, ascites;
- weight, height, BMI (below 18,5 it is malnutrition);
- determination of adipose tissue and lean body mass, thickness of skin folds with a caliper, dynamometry, hand grip strength.

### Laboratory findings

- visceral proteins (albumin, transferrin, prealbumin) are reduced;
- lymphocytes are decreased;
- serum cholinesterase activity;
- under stress, albumin is also reduced as it is a negative acute phase protein;
- increased capillary permeability (capillary leak syndrome);
- after rehydration treatment:

albumin – half 21 days – standard 35–50,

transferrin – 9 days,  
prealbumin – 2 days,  
lymphocytes – 1500–4000.

## Links

### Related articles

- Biochemical evaluation of nutrition
- Evaluation of nutritional status
- Obesity
- Carbohydrates in the diet
- Fats in the diet
- Proteins in the diet
- Diseases from excess or deficiency of nutrients
- Nutrition recommendations
- Eating disorders

### Source

- PASTOR, Jan. *Langenbeck's medical web page* [online]. ©2006. [cit. 14.11.2010]. <<https://langenbeck.webs.com/interna.htm>>.